JAPANESE KOKAI PATENT (A), HEI 10-114142

Disclosure Date : May 6, 1998

Int. Class. :	I. D. Code :	Seq. No. for Official Use :
B 41 M 5/00	B	
B 05 D 1/30		
5/04		
7/00	F	
7/24	302	

TITLE OF INVENTION : Inkjet Recording Paper

APPLICATION NO. AND DATE : HEI 8-269727, October 11, 1996

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NUMBER OF CLAIMS : 3

REQUEST FOR EXAMINATION : None

Abstract
[Object] To provide an inkjet recording paper that excels in water resistance and has excellent curtain coating compatibility.

[Solution] An inkjet recording paper provided with a coated layer on a substrate paper, where the coated layer contains a synthetic amorphous silica, water-based binder, and cationic polyacrylamide having a molecular weight of 500,000 - 1–200,000. In this inkjet recording paper, the cationic value of the cationic polyacrylamide is preferably 1.5 – 5.0 ml/g, and the coated layer is formed preferably by using a curtain coater.

Claims
[Claim 1] An inkjet recording paper provided with a coated layer on a substrate paper, where the coated layer contains a synthetic amorphous silica, water-based binder, and cationic polyacrylamide having a molecular weight of 500,000 – 1,200,000.

[Claim 2] The inkjet recording paper according to Claim 1, where the cationic value of the cationic polyacrylamide is 1.5 – 5.0 ml/g.

[Claim 3] The inkjet recording paper according to Claim 1 or Claim 2, where the coated layer is formed by using a curtain coater.

Comprehensive explanation of invention
[0001]
[Technological field of invention]
This invention relates to an inkjet recording paper, and particularly to an inkjet recording paper that excels in water resistance and has excellent curtain coating compatibility.

[0002]
[Prior art]
Inkjet recording system allows multicolor recording, has relatively high recording speed, and can be used for recording to make a large copy. On the other hand, work is underway to improve the ink and the equipment to solve the problems of the prior art, such as clogging of nozzle and maintenance problem. Currently, inkjet recording system is widely used in various areas such as in printer, FAX machine, computer terminals and so on, and its field of application is expanding.

[0003]
Now, in color inkjet process, water-based ink solutions having various colors such as cyan (C), magenta (M), yellow (Y), and black (K) are ejected from a plurality of ink nozzles toward the inkjet recording paper. If it is a monochromic flat print made from only one color, the inkjet recording paper needs to absorb only one kind of water-based ink solution of that color. However, in case of a mixed color flat printing using two or more colors such as cyan (C) and green (G) colors and so on, the inkjet recording paper

must absorb two or more water-based ink solutions of each colors. Due to this reason, the inkjet recording paper to be used in color inkjet process must have excellent ink absorbing property.

[0004]

To improve the ink absorbing property, traditionally a paper having a supporting member that can improve the absorbability of a vehicle such as water or solvent by regulating the bulk height, air permeability and degree of sizing, has been proposed. With such conventional paper, however, the ink droplets tend to spread irregularly on the paper surface, resulting in causing an ink streak that lowers the color density. If ink absorbability is deficient, ink seepage may occur due to excessively large spread of the ink dots. And, in a mixed color flat printed area, ink seepage may occur also and thus it has not been possible to obtain a color image that has high density and clearness. On the other hand, with the conventional paper, dyes in the ink may leach out from the printed paper during its storage due to insufficient water resistance, and as a result it has not been possible to maintain the quality of the printed image for a long period of time. Loss of the printed image containing valuable information during its storage poses a serious problem, and thus development of a technology to improve the water resistance of the inkjet recording paper is highly desired. And, in the inkjet recording paper, the coated layer formed by coating a coating solution on a paper base by curtain coating technique has an advantageous flatness and smoothness of its surface. Therefore, development of an inkjet recording paper with an acceptable curtain coating compatibility is highly desired.

[0005]

[Problems to be solved by the invention]

This invention intends to solve the problems of the prior art, and to attain the following object. Thus, the object of this invention is to provide an inkjet recording paper that excels in water resistance and has an excellent curtain coating compatibility.

[0006]

[Means to solve the problems]

The above-described problems were solved by the following means.

(1) An inkjet recording paper provided with a coated layer on a substrate paper, where the coated layer contains a synthetic amorphous silica, water-based binder, and cationic polyacrylamide having a molecular weight of 500,000 – 1,200,000.

(2) The inkjet recording paper described in (1), where the cationic value of the cationic polyacrylamide is 1.5 —5.0 ml/g.

(3) The inkjet recording paper described in (1) or (2), where the coated layer is formed by using a curtain coater.

[0007]
[Embodiments of invention]
The inkjet recording paper of this invention is formed by providing a coated layer on the substrate paper ("substrate", hereinafter). Examples of the substrate are those which are made mainly of wood pulp, such as LBKP or NBPK and so on. If necessary, the substrate may contain synthetic pulp or synthetic fiber and so on. Preferred water drainage after beating is 250 – 450 cc (C.S.F.). The substrate in this invention may contain filler, size, paper reinforcing agent, and fixing agent and so on, as needed.

[0008]
Examples of filler are clay, talc, TiO_2, $CaCO_3$, $BaSO_4$, and so on. Content of filler is normally 0 – 30 weight parts, based on the weight of the pulp. Examples of the size are rosin, alkenylsuccinate salts, stearate salts, alkylketene dimers, alkenylsuccinic anhydride and so on. Examples of the paper reinforcing agent are starch, gelatin, CMC, polyacrylamide and so on. And, examples of the fixing agent are aluminum sulfate, aluminum chloride, polyamide polyamine epichlorohydrin and so on.

[0009]
Density of the substrate is normally 30 – 250 g/m^2, preferably 50 – 150 g/m^2. Thickness of the substrate is normally 30 – 250 μm, preferably 50 – 150 μm. And, preferred whiteness (Hunters value) of the substrate is more than 70%. Preferred rigidity (taper) of the substrate is 1 – 29 g. Preferred water absorbability of the substrate, determined by the procedure specified in JIS P-8140, is 10 – 30 g/m^2. If the water absorbability is less than 10 g/m^2, it tends to create ink streaks. On the other hand, if the water absorbability exceeds 30 g/m^2, it tends to form white through-spots.

[0010]
The coated layer contains synthetic amorphous silica, water-based binder, and cationic polyacrylamide. If necessary, the coated layer may contain other additional components.

[0011]
Silicic anhydride obtained by dry process and water-containing silicic acid obtained by wet process such as gel process or precipitation process, can be mentioned as the examples of synthetic amorphous silica. Among them, water-containing silicic acid is preferred, because it has excellent absorbability due to its porous nature, has a relatively large average particle size and can effectively prevent formation of white through-spots. The synthetic amorphous silica may be the one obtained by an appropriate production process, or it may be a commercial product.

[0012]
Specific surface area of the synthetic amorphous silica is 300 – 500 m^2/g, preferably 320 – 450 m^2/g. Specific surface area can be determined by BET adsorption method. If it is smaller than 300 m^2/g, ink absorbability may be poor and the ink may diffuse out. And, if it exceeds 500 m2/g, production of inkjet recording paper may face a difficulty. Pore volume of the synthetic amorphous silica is greater than 1.0 ml/g, and greater than

1.3 ml/g is preferred. If the pore volume is less than 0.5 ml/g, it may not have sufficient ink absorbability.

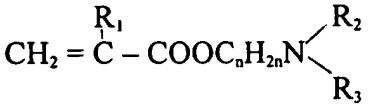
[0013]
Average particle size of the synthetic amorphous silica is 2 – 13 μm, preferably 3 – 10 μm. Average particle size can be determined by using a Coulter counter. If the average particle size is smaller than 2 μm, the ink may not spread sufficiently, the size of the ink dots may become smaller, and white through-spots may be formed. On the other hand, if it exceeds 13 μm, flatness/smoothness of the surface of the coated layer in the inkjet recording paper may drop, to cause roughness or powder dropoff.

[0014]
Content of synthetic amorphous silica in the coated layer is more than 50 weight parts, preferably 70 – 100 weight parts, per 100 weight parts of the total amount of pigments in the coated layer. If the content is less than 40 weight parts, the ink may not have enough spreading property, the size of the ink dots may become smaller, and white through-spots may form. On the other hand, if the content is in the preferred range, the inkjet recording paper does not have flaws, and it can effectively prevent formation of white through-spots.

[0015]
Examples of water-soluble binders are water-soluble binders, water-dispersible binders and so on. Examples of water-soluble binder are polyvinyl alcohol, starch, cationic starch, casein, gelatin, carboxymethylcellulose, hydroxyethylcellulose, polyvinyl pyrrolidone and so on. Examples of water-dispersible binder are styrene/butadiene latex, acrylic emulsion and so on. They may be used alone, or as a mixture of two or more.

[0016]
Cationic polyacrylamide is a copolymer made from acrylamide and cationic monomer. In occasion, it may be a ternary copolymer formed by adding and copolymerizing the above monomers with an additional monomer component such as (meth)acrylic acid. Examples of the cationic monomer are the compounds represented by the following general formula (I), compounds represented by the following general formula (II), and salts of these compounds.

[0017]
[Chemical formula 1]



(I)

[0018]
[Chemical formula 2]

(II)

[0019]
In the general formula (I) and (II), R_1 represents a hydrogen atom or a lower alkyl group. R_2 and R_3 represent lower alkyl groups. And, n represents an integer 1 - 5.

[0020]
Examples of the cationic monomer are dimethylaminoethyl methacrylate [CH_2=$C(CH_3)COOC_2H_2N(CH_3)_2$], diethylaminoethyl methacrylate [CH_2=$C(CH_3)COO$-CH_2CH_2-$N(CH_2CH_3)_2$,, dimethylaminoethyl methacrylate chloride [CH_2=$C(CH_3)COOCH_2$-CH_2-$N(CH_3)_2$].Cl, and dimethylaminopropyl acrylamide [CH_2=$CHCONHCH_2CH_2$ and so on.

[0021]
Molecular weight of the cationic polyacrylamide is 500,000 – 1,200,000, preferably 600,000 – 1,000,000. And, lower limit of the molecular weight is either the lower limit of the above-described range or the molecular weight being adopted in the examples to be described later. And, the upper limit of the molecular weight is either the upper limit of the above-described range or the molecular weight being adopted in the examples to be described later. If the molecular weight of the cationic polyacrylamide is less than 500,00, the inkjet recording paper will show insufficient water resistance. And, if it exceeds 1,200,000, it will have a poor curtain coating compatibility, which is not desirable. Incidentally, the molecular weight is the molecular wiehgt determined by using a light scattering photometer.

[0022]
Cationic value of the cationic polyacrylamide can be determined in the following manner, for example. Thus, a sample about 0.1 g is weighed carefully, and diluted in a diluting solution (water/methanol/acetic acid = 89/10/1, volume %). This solution was titrated with and aqueous N/400 potassium polyvinylsulfate (PVSK) solution, and the cationic value is calculated by the following formula. Incidentally, the nonvolatile

Cationic value = [Amount being used for titration (ml) x 1/400
x factor (PVSK)]/[Amount of sample taken (g)
x nonvolatile component (%)/100].

component in the above-described formula can be determined in the following manner. Thus, sample 3.0 ± 0.2 g was spread in a Petri dish (50 mm x 15 mm) and weighed accurately. After drying for 3 hours in a hot air-circulated oven at 105 ± 5°C, it was transferred into a desiccator to allow it to cool down in 30 minutes. Then, it was weighed accurately to determine the dry weight. Nonvolatile component was calculated by the following formula.

Nonvolatile component (%) = [Dry weight (g)/Amount of sample taken (g)]
x 100

[0023]
Preferred cationic value of the cationic polyacrylamide is 1.5 – 5.0 mg/g, and 1.8 – 3.5 mg/g is even more desirable. Lower limit of the cationic value is either the lower limit of

the above-described range or the cationic value being adopted in the examples to be described later. And, upper limit of cationic value is either the upper limit of the above-described range or the cationic value being adopted in the examples to be described later. If the cationic value is less than 1.5 mg/g, the inkjet recording paper will have insufficient water resistance. On the other hand, if it exceeds 5.0 mg/g, coating compatibility such as the viscosity of the coating solution will be poor, which is not desirable.

[0024]
The amount of cationic polyacrylamide in the coated layer is 10 – 80 weight parts per 100 weight parts of the synthetic amorphous silica. If the content is less than 10 weight parts, the water resistance may be poor. On the other hand, if it exceeds 80 weight parts, coating compatibility such as the viscosity of the coating solution may be poor, which is not desirable.

[0025]
There is no particular restriction about the other components to be used in this invention, and they can be selected appropriately based on the object and application of the inkjet recording paper. Examples of other components are surface active agent, pigment, light resistance-improving agent, and additions and so on.

[0026]
Examples of surface active agents are anionic surface active agents such as carboxylate salts, sulfonate salts, sulfate ester salts, phosphate ester salts; ether type nonionic surface active agents and ether ester type nonionic surface active agents; and amphoteric surface active agents such as betain, aminocarboxylate salts, and imidazoline derivatives and so on. Among these surface active agents, sulfonate salts are prefered, and dialkyl sulfonate salts such as sodium dimethylpentylsulfonate are particularly desirable. If dialkyl sulfonate salt is used as the surface active agent, the content is 1 – 12 weight parts, preferably 1 – 10 weight parts, per 100 weight parts of synthehtic amorphous silica in the coated layer. If the content is less than 1 weight part, ink absorbability will be insufficient, and more than 12 weight parts will lower the color density.

[0027]
Examples of pigments, beside the synthetic amorphous silica, are white pigments such as calcium carbonate, kaolin, talc, clay, diatomaceous earth, magnesium silicate, calcium silicate, alumina, zeolite, barium sulfate, urea resin, melamine resin and so on.

[0028]
Examples of light resistance-improving agent are zinc sulfate, zinc oxide, hindered amine type antioxidants, and benzotriazole type UV absorbers such as benzophenone. Among them, zinc sulfate is particularly desirable for this invention.

[0029]
Examples of other additives are pigment dispersing agent, tackifying agent, antifoam, dyes, fluorescent whitener, preservatives, pH regulating agent and so on.

[0030]
The coated layer in this invention is formed by coating a coating solution comprising the synthetic amorphous silica, water-based binder, cationic polyacrylamide, and, if necessary, other components, on the substrate and then drying the coated material. The thus-formed coated layer functions as the ink-accepting layer in the inkjet recording paper.

[0031]
There is no particular restriction about the method with which to coat the coating solution on the substrate, and appropriate method can be selected to match the purpose. For example, curtain coater, roller coater, reverse roll coater, air knife coater, blade coater, spray coater, spin coater and so on can be mentioned. Among them, curtain coater is preferred in this invention because the surface coated with the coating solution, in other words the surface of the coated layer, will have an excellent smoothness and flatness. The coating solution in this invention has an excellent curtain coating compatibility. Therefore, if the coating solution is coated by using a curtain coater, a coated layer having a surface with excellent flatness and smoothness can be formed.

[0032]
Amount of the coating solution to be coated on the substrate is normally 6 – 10 g/m^2, preferably 8 – 10 g (solid)/m^2. If the amount of solids in the coating solution being coated is less than 6 g/m^2, the ink absorbability may be poor. On the other hand, if it exceeds 10 g/m^2, it may cause decrease of color density due to formation of white through-spots. And, if the amount coated is in the above-said preferred range, it shows no flaws, and the inkjet recording paper with excellent ink absorbability, smaller spread of ink dots, and excellent writing property can be prepared.

[0033]
In this invention, the coated layer may be a single layer structure or a laminated structure, depending on the purpose and application of the inkjet recording paper. Incidentally, a coated layer of laminated structure can be formed by coating the coating solution on the substrate and then coating the coating solution again on the coated surface.

[0034]
In the inkjet recording paper of this invention, a backcoat layer may be formed on the surface opposite to the side where the coated layer is formed. Formation of a backcoat layer on the inkjet recording paper has a definite advantage because it can effectively prevent curling or wrinkling of the inkjet recording paper. The backcoat layer is formed by coating a backcoat layer-forming solution on the surface opposite to the side where the coated layer is formed on the substrate.

[0035]
The backcoat layer-forming solution contains an anionic surface active agent. And, if necessary, it may contain also antifoam, foam suppresser, dyes, fluorescent whitener, and/or preservative and so on.

[0036]

And, (A) carboxylic acid system, (B) sulfate ester systems, (C), sulfonic acid system, and (D) surface active agents having other hydrophilic groups can be mentioned as the examples of anionic surface active agent. Examples of carboxylic acid system (A) are soaps of aliphatic acids and rosin acids, and salts of ether acids. Examples of sulfate esters are (1) alkyl sulfate ester salts, (2) sulfate esters of aliphatic acid esters and sulfated oils, (3) sulfate ester salts of aliphatic acyl amides, (4) and sulfate ester salts of glycol ethers and so on. Examples of sulfonic acid system (C) are (1) alkylsulfonate salts, (2) dialkyl sulfosuccinate ester salts, (3) alkylallyl sulfonic acid, (4) alkylnaphthalene sulfonate salts, (5) alkyl amide sulfonate salts, and (6) alkyl ester sulfonate salts and so on. And, examples of the surface active agents having other hydrophilic groups are phosphate esters and so on. Among them, dialkyl sulfosuccinate ester salts are preferred, and diethylhexyl sulfosuccinate ester salt is particularly desirable. Of the diethylhexyl sulfosuccinate ester salts, di-2-ethylhexyl sulfosuccinate ester is particularly desirable. And, if di-2-ethylhexyl sulfosuccinate ester is used as the anionic surface active agent, the preferred content in the backcoat layer-forming solution is 0.001 – 0.03 weight %.

[0037]

Surface tension of the backcoat layer-forming solution is normally 25 – 40 dynes/cm. Preferred amount of the backcoat layer-forming solution to be coated is 5 cc/m^2. The backcoat layer-forming solution can be coated by means of a curtain coater, bar coater, gravure coater, roll coater, reverse roll coater, air knife coater, blade coater, spray coater or spin coater and so on.

[0038]

And, if the coated layer has a laminar strucuture, it is desirable to coat the backcoat layer-forming solution on the surface opposite to the side on which the coated layer was formed.

[0039]

In case of producing the inkjet recording paper of this invention, after coating the coating solution on one surface of the substrate and then coating the backcoat layer-forming solution on the other surface of the substrate, the coated surfaces are dried. Preferred drying temperature is higher than 80°C because it can prevent curing effectively, and 100°C or higher is particularly desirable. A method using a drum dryer is a preferred drying method, and it is desirable to use a drying method by which the surface coated with the backcoat layer-forming solution contacts with the surface of the drum dryer.

[0040]

An ordinary inkjet printer may be used with the inkjet recording paper of this invention to form a recorded image. However, it is also possible to use a high resolution inkjet printer to form a recorded image.

[0041]

A dye type recording fluid or pigment type recording fluid can be mentioned as the example of recording fluid that can be applied on the inkjet recording paper of this invention. Examples of the dye type recording fluid are the recording fluids containing water-soluble dyes such as direct dyes, acidic dyes, reactive dyes, basic dyes and so on. As the dye type recording fluid, normally the recording fluids having four colors (yellow, magenta, cyan and black) are used. In these colored recording fluids, content(s) of one, two or more water-soluble dye(s) is normally 0.2 – 15 weight parts, preferably 0.5 – 10 weight parts, based on the weight of the total ink composition. And, a content of 2 – 9 weight parts is particularly desirable.

[0042]

Beside water, the recording fluid may be mixed with a solvent. Examples of the solvent are alkyl alcohols having 1 – 10 carbons such as methyl alcohol, ethyl alcohol, n-propyl alcohol, isopropyl alcohol, n-butyl alcohol, *sec*-butyl alcohol, *tert*-butyl alcohol, isobutyl alcohol, pentyl alcohol, hexyl alcohol, heptyl alcohol, octyl alcohol, nonyl alcohol, decyl alcohol and so on; aliphatic or aromatic hydrocarbon type solvents such as cyclopentane, hexane, cyclohexane, heptane, octane, nonane, decane, undecane, dodecane, tridecanone, tetralin, decalin, benzene, toluene, and xylene; halogenated hydrocarbon type solvents such as carbon tetrachloride, trichloroethylene, tetrachloroethylene, dichlorobenzene and so on; ether type solvents such as ethyl ether, butyl ether, ethyleneglycol diethyl ether, ethyleneglycol monoethyl ether and so on; ketone type solvents such as acetone, methylethyl ketone, methylpropyl ketone, methylamyl ketone, cyclohexanone and so on; ester type solvents such as ethyl formate, methyl acetate, ethyl acetate, propyl acetate, butyl acetate, phenyl acetate, ethyleneglycol monoethyl ether acetate, ethyl lactate and so on; polyvalent alcohols such as ethyleneglycol, diethyleneglycol, propyleneglycol, glycerin and so on; amines; amides; nitrogen heterocyclics such as N-methyl-2-pyrrolidone, 1,3-dimethyl-2-imidazolidinone and so on; intramolecular oxycarboxylate ester type solvents such as valerolactone, caprolactone and so on; aliphatic sulfone compound type solvents such as dimethyl sulfone, diethyl sulfone, BIS(2-chloroethyl) sulfone, methyl sulfonyl acetonitrile and so on; alicyclic sulfone compound type solvents such as sulforane, sulforene and so on; and sulfoxide compound type solvents such as tetramethylene sulfoxide, 3-methyl tetramethylene sulfoxide and so on.

[0043]

Recording fluid prepared by dispersing the fine pigment particles in an aqueous dispersion medium containing a polymer having hydrophilic constituent and hydrophobic constituent and also an water-soluble organic solvent is preferred as the pigment type recording fluid. Examples of the polymer are polyacrylic acid, polymethacrylic acid, condensed naphthalene sulfonic acid, and styrene/maleic acid copolymer that have a molecular weight of 1,000 – 100,000 or thereabout. These polymers, formed as a salt, can be dissolved or dispersed in the aqueous liquid. Examples of the components that form the polymer salts are alkaline metals, aliphatic amines, alcohol amines, morpholine, N-morpholine and so on. Examples of the water-soluble organic solvent are alcohols. And, in this invention, polyvalent alcohols are particularly suitable.

[0044]
A recording fluid having a viscosity in a certain range can be obtained by mixing and dispersing the polymer aqueous organic solvent, water and fine pigment particles. Examples of the fine pigment particles to be used in this recording fluid are various known types of organic pigments such as azo type, phthalocyanine, quinacridone, anthraquinone, dioxazine, indigos, perynone and so on.

[0045]
This invention is explained further by the following examples which, however, are not intended to limit the scope of this invention.

[0046]
Example 1
< Preparation of substrate >
Wood pulp made of LBKP 80 weight parts and NBKP 20 weight parts was beaten in a disk finery, to obtain a pulp slurry having Canadian Freeness = 400 ml. While the thus-obtained pulp slurry was being agitated, talc 5 weight parts, rosin 1.2 weight part, starch 1.5 weight part, and aluminum sulfate 1.5 weight part were added to pulp 100 weight parts, and this mixture was processed in a long net paper making machine, to form a paper stock having a density of 80 g/m^2. During the course of making a paper, oxidized starch (1.0 g solid/m^2) was attached on the surface of the paper by means of a surface size press, to form a coating substrate. Thickness of the substrate was 95 μm, and Cobbs (SIC) water absorbability was 21.0 g/m^2.

[0047]
< Preparation of coating solution and formation of coated layer >
An aqueous solution containing synthetic amorphous silica (Fineseal X60, a product of Tokuyama K.K., 65 weight parts; Mizukasil P78D, a product of Mizusawa Kagaku K.K., 35 weight parts) 35 weight parts, sodium hexametaphosphate 1 weight part and cationic polyacrylamide (molecular weight = 600,000, cationic value = 5.0 ml/g) 20 weight parts was dispersed in a Desolver (model AM-O, manufactured by Tokushu Kika Kogyo K.K.) for 20 minutes, and then polyvinyl alcohol (R-1130, a product of Kuraray K.K.) 42.5 weight parts and fluorescent whitener 3 weight parts were added in this dispersion and agitated. Then, a surface active agent (Aerosol MA-80, a product of Mitsui Scitek K.K.) 7 weight parts was added in this aqueous solution, to prepare a coating solution having a solid content of 17 weight %. This coating solution was coated on the substrate by means of a curtain coater (coating speed = 300 m/minute, amount coated = 8.5 g solid/m^2). After drying, it was calendered, to form an inkjet recording paper.

[0048]
Examples 2 – 4 and Comparative Examples 1 – 3
Procedure of Example 1 was followed, except changing the molecular weight and cationic value of the cationic polyacrylamide to those shown in Table 1, to prepare inkjet recording papers.

[0049]
Water resistance and curtain coating compatibility of the thus-prepared inkjet recording papers were evaluated, and results are shown in Table 1.

< Evaluation >

(1) Water resistance : Black ink, cyan ink, magenta ink, or yellow ink was printed (diameter of print = 2 cm) on the inkjet recording paper by using an inkjet printer (model BJC-400J, manufactured by Canon K.K.) to prepare a sample. Flow of ink after the sample was dipped in water (20°C) for 5 minutes was examined by naked eyes, based on the following standard. Standard of evaluation was based on the following three levels. If it was better than Δ, the sample was considered acceptable.

O : No flow of ink
Δ : Some flow of ink
X : Significant flow of ink

(2) Curtain coating compatibility : Whether the coating solution could be coated on the substrate by means of a curtain coater or not was evaluated.

[0050]
[Table 1]

	Cationic polyacrylamide			
	Molecular weight	Cationic value (ml/g)	Water resistance	Curtain coating compatibility
Example 1	600,000	5.0	O	No problem
Example 2	800,000	2.4	O	No problem
Example 3	1,100,000	1.5	O	No problem
Example 4	600,000	1.0	Δ	No problem
Comparative Example 1	400,000	5.0	X	No problem
Comparative Example 2	1,300,000	1.5	O	Had problem
Comparative Example 3	1,700,000	2.8	O	Had problem

"Had problem" : It means the coating solution could not be coated by curtain coating method.

[0051]
Following facts are clearly shown in Table 1. Thus, when the molecular weight of cationic polyacrylamide was less than 500,000 (Comparative Example 1), the inkjet recording paper did not have sufficient water resistance. And, when the molecular weight of cationic polyacrylamide exceeded 1,200,000 (Comparative Examples 2 and 3), it showed insufficient curtain coating compatibility. On the other hand, when the molecular weight of cationic polyacrylamides was within the range specified in Claim 1 (Examples 1 – 4), the inkjet recording papers showed excellent water resistance and curtain coating compatibility. And, when the cationic value of cationic polyacrylamides was within the range specified in Claim 2 (Examples 1 – 3), the inkjet recording paper clearly showed a better water resistance than when its cationic value was beyond the range specified in Claim 2 (Example 4).

[0052]
[Effect of invention]

According to this invention, problems encountered by the prior art can be solved. And, according to this invention, inkjet recording paper with excellent water resistance and curtain coating compatibility can be provided.